

University of California
College of Agriculture
Agricultural Experiment Station
Berkeley, California


An Analysis of the Prices Received for Canned
Asparagus by Cannerymen in California -- Seasons,
1925-26 Through 1934-35

by

H. J. Stover

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An Analysis of the Prices Received for Canned
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H. J. Stover¹

In response to a need for some basis for estimating the probable quantities of canned asparagus which might be sold during a given season at various prices and with various assumed demand conditions, an analysis was made to determine the more important factors which have been responsible for the variations in the annual average f.o.b. prices received for canned asparagus by cannerymen in California from 1925-26 to 1934-35 and to measure the influence of each of these factors upon those prices. The results presented herein constitute a report of that analysis.

Users of this report should clearly recognize the fact that the analysis explains only what has occurred in the past. It does not forecast what will happen in the future. The analysis is designed merely to serve as a helpful guide in estimating either the probable price at which a given quantity of canned asparagus can be sold or the probable quantity that can be sold at a given price, under given conditions. In making these estimates, it is first necessary to determine the probable future positions of the factors which have affected canned-asparagus prices in the past.

Relation Between the F.O.B. Prices and Shipments of Canned Asparagus.--
The historical picture of canned-asparagus packs, carryovers, supplies available for shipment, shipments, and f.o.b. prices received by cannerymen since 1925 is presented in table 1. In 1934 the pack amounted to 1,914,000 cases. The carryover from the 1933-34 season was 161,000 cases, which added to the pack figure, gave a total supply of 2,075,000 cases available for shipment during the 1934-35 season. Shipments amounted to 1,980,000 cases, leaving a carryover into the 1935-36 season of 95,000 cases. The average f.o.b. price received by cannerymen for the canned asparagus sold during the 1934-35 season was \$4.49 per case -- an increase of 23 per cent over the price received the preceding year.

In figure 1 the f.o.b. prices received by cannerymen given in column 6 of table 1 are plotted against the shipments of canned asparagus given in column 4 of table 1. The average^{net} relationship between these two factors (meaning the relationship which would be expected after relationships with other factors have been taken into account) is indicated by the curve in this chart. Comparisons of the actual f.o.b. prices of canned asparagus with the prices estimated from this curve are made in table 2. The portion of the variation in canned-asparagus prices which has not been accounted for by the relationship expressed in figure 1 is given in column 4 of table 2.

¹Assistant Professor of Agricultural Economics, Assistant Agricultural Economist in the Experiment Station, and Assistant Agricultural Economist on the Giannini Foundation.

Relation Between the Variations in Canned-Asparagus Prices Unexplained by the Relationship with Shipments, and Measures of General Demand Conditions.--

One of the most important factors affecting the price at which a given quantity of any product can be sold during a given season is the condition of consumer demand for the product at that time. Of the many factors which determine the status of this demand, there is one which is of paramount importance. That factor is consumer income. The higher the level of consumer incomes, the higher may one expect the prices to be at which a given quantity of a product can be sold.

A monthly index of the incomes of urban consumers has been compiled by the Bureau of Agricultural Economics of the United States Department of Agriculture for the fifteen years 1919-1933 inclusive. In this index, weight was given to industrial workers' income, to trade, to service industries, to public utilities, to government, and to interest and dividends. Compilation of the index was discontinued in December, 1933. Monthly data for the period since January, 1922 are presented in figure 2.

As indicated in figure 2, there has been a fairly high degree of correlation between the index of urban-consumer income and an index of industrial production compiled by the Federal Reserve Board during the period for which both indexes are available. The relationship of the two index series seems to indicate that, in general, urban-consumer income is largely dependent upon the level of industrial production a few months earlier. This relationship becomes very useful in estimating consumer income in advance, as must be done in a determination of the probable prices at which a given quantity of a product can be sold during a coming season.

The unexplained price-variations in column 4 of table 2 are plotted against both the index of urban-consumer income and the index of industrial production in figure 3. The data are presented in tabular form in table 3.

The slope of the line in figure 3 indicates the degree to which changes in consumer incomes have influenced the prices of canned asparagus during the ten years included in the analysis. The variations in canned-asparagus prices which have not been accounted for either by variations in shipments or by variations in consumer income, as measured by the index numbers, are given in columns 6 and 7 of table 3.

Trend of Demand as a Factor Affecting the Prices of Canned Asparagus.--
There is evidence present in the data which indicates that prior to about 1929 the demand for canned asparagus in the United States was growing at a fairly rapid rate. In accounting for the variations in the prices of canned asparagus which are not explained by variations in supplies and in consumer incomes, this factor needs to be considered.

The degree to which the upward trend in the demand for canned asparagus has affected the prices of canned asparagus is indicated in figure 4. The data are presented in table 4. Variations in canned-asparagus prices which have not been accounted for by any of the three factors included in the analysis are given in columns 4 and 5.

Comparison of the Estimated with the Actual Prices of Canned Asparagus.--

A summary of the variations in canned-asparagus prices which have been accounted for by each of the several factors taken into consideration is presented in table 5. Estimates of the prices based on their relationship to shipments, index of urban-consumer incomes, and trend of demand are given in column 5. Estimates based on shipments, index of industrial production, and trend of demand are in column 6. The actual prices are given in column 7.

A comparison of the several estimated prices of canned asparagus with the actual prices is shown, graphically, in figure 5.

Use of the Results of this Analysis.-- As indicated earlier in this report, this analysis has been made for the purpose of providing some basis for estimating the probable quantities of canned asparagus which might be sold during a given season at various prices and with various assumed demand conditions.

The curves plotted in figure 6 and the readings from these curves, given in tables 6 and 7, are presented for the purpose of illustrating the proper use of the results of this analysis. If, for example, one should assume that during a particular season demand conditions would approximate those of the 1934-35 season, an estimate of the price which might be expected for shipments of 2,500,000 cases would be \$3.90 (see either table 6 or figure 6). Under similar conditions, shipments of 2,000,000 cases might be expected to sell for around \$4.46. Considering the problem from the point of view of estimating the quantities of canned asparagus which might be sold at a price of, let us say, \$4.75 per case, one would, from readings in table 7 or figure 6, estimate that under conditions similar to those of the 1934-35 season, 1,800,000 cases could be sold.

TABLE 1

Pack, Carryover, Shipments, and F.O.B. Prices of Canned Asparagus, California, 1925-1935 (years beginning March 1)

Year beginning March 1	Pack	Carryover from preceding year	Supply available for shipment	Shipments	Carryover into the following year	F.O.B. prices received by canners
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
	<u>000 cases</u>	<u>000 cases</u>	<u>000 cases</u>	<u>000 cases</u>	<u>000 cases</u>	<u>dollars per case</u>
1925	1,745	170	1,915	1,664	251	6.16
1926	2,236	251	2,467	2,080	407	5.84
1927	2,190	407	2,597	2,195	402	5.57
1928	2,338	402	2,740	2,471	269	5.78
1929	2,673	269	2,942	2,691	323	5.84
1930	2,663	323	2,986	2,028	958	5.79
1931	1,747	958	2,705	1,646	1,059	5.69
1932	1,313	1,059	2,372	1,918	454	4.24
1933	2,135	454	2,589	2,428 ^{2,313}	161 ²⁷⁶	3.65
1934	1,914	161 ²⁷⁶	2,075 ^{2,190}	1,980	95 ²¹⁰	4.49
1935		95 ²¹⁰				

Sources of data:

Cols. 1, 2, 4, and 5: Compiled by the Canners League of California.

Col. 3: Col. 1 plus col. 2.

Col. 6: Compiled from records of canners. Prices are weighted average prices for all grades and sizes of cans, f.o.b. cannery. Regular brokerage, cash discount, swell allowance, and label allowance are included.

F.O.B. prices
(dollars per case)

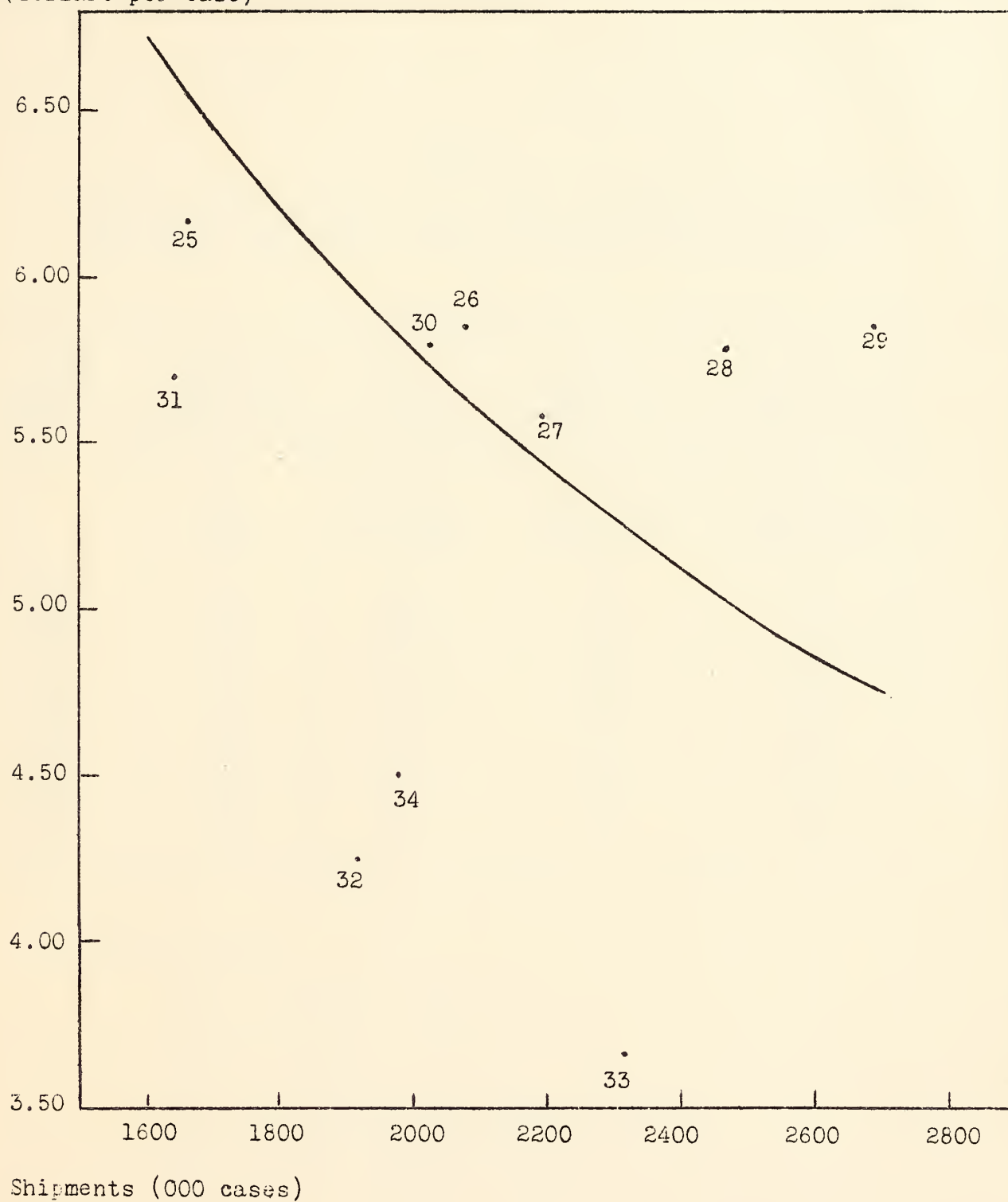


Figure 1

Relation Between the F.O.B. Prices and Shipments of Canned
Asparagus, California, 1925-1934 (years beginning March 1)

(Data from table 2)

TABLE 2

Relation Between the F.O.B. Prices and Shipments of Canned Asparagus, California, 1925-1934 (years beginning March 1)

Year begin- ning March 1	Shipments of canned asparagus	F. O. B. prices of canned asparagus	Price estimates (fig. 1)	Price residuals (fig. 1)
	1	2	3	4
	<u>000</u> <u>cases</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>
1925	1,664	6.16	6.55	-0.39
1926	2,080	5.84	5.64	+0.20
1927	2,195	5.57	5.44	+0.13
1928	2,471	5.78	5.03	+0.75
1929	2,691	5.84	4.75	+1.09
1930	2,028	5.79	5.73	+0.06
1931	1,646	5.69	6.60	-0.91
1932	1,918	4.24	5.94	-1.70
1933	2,313	3.65	5.26	-1.61
1934	1,980	4.49	5.82	-1.33

Sources of data:

Col. 1: Table 1, col. 4.

Col. 2: Table 1, col. 6.

Col. 3: Readings from curve in fig. 1.

Col. 4: Col. 2 minus col. 3.

Index (1923-25=100)



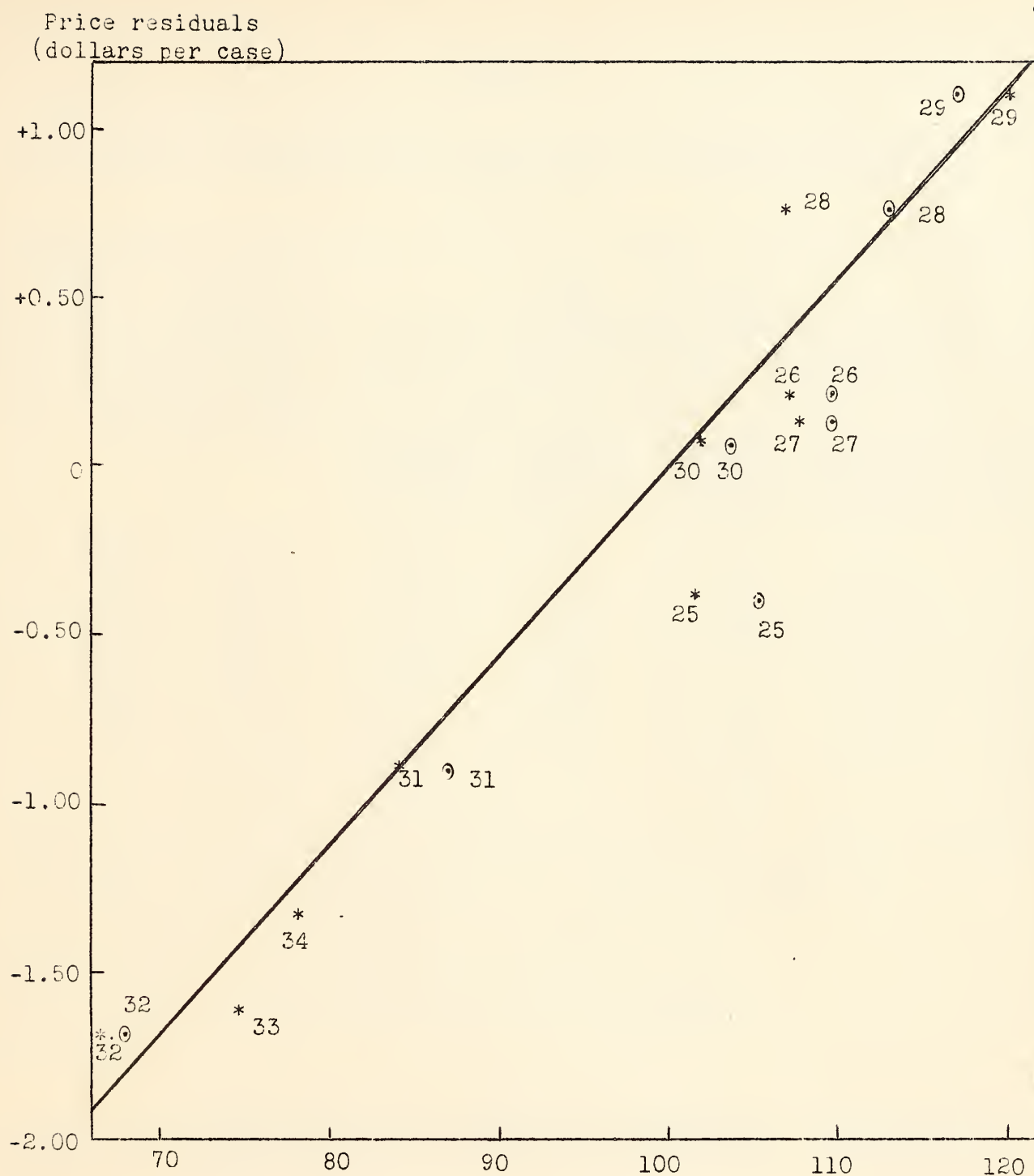
Figure 2

Monthly Index Numbers of Urban-Consumer Incomes[†] and of
Industrial Production[‡] (lagged five months), United States
1922-1934. (1923-25=100)

* Index of industrial production lagged five months, i.e., August, 1921 corresponds with January, 1922, etc.

† Unpublished index compiled by the Bureau of Agricultural Economics of the United States Department of Agriculture. Compilation discontinued December, 1933.

‡ Federal Reserve Board Index of Industrial Production (adjusted for seasonal variation), published monthly in the Federal Reserve Bulletin.



Indexes of Urban-Consumer Incomes and of Industrial Production
(1923-25=100)

○ Price residuals plotted against index of urban-consumer income.
* Price residuals plotted against index of industrial production.

Figure 3

Relation Between the Unexplained Price Variations in Figure 1
and Indexes of Urban-Consumer Incomes and of Industrial Production,
1925-1934

(Data from table 3)

TABLE 3

Relation Between the Unexplained Price Variations in Table 1
and Indexes of Urban-Consumer Incomes and of Industrial Production
1925-1934

Year begin- ning March 1*	Index of urban- consumer incomes (1923-25 = 100)	Index of industrial production (1923-25 = 100)	Price residuals (fig. 1)	Price residual estimates† (fig. 3)	Price residual estimates‡ (fig. 3)	Price residuals† (fig. 3)	Price ‡ residuals (fig. 3)
	1	2	3	4	5	6	7
			<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>
1925	104.9	101.5	-0.39	+0.27	+0.09	-0.66	-0.48
1926	109.6	107.2	+0.20	+0.53	+0.40	-0.33	-0.20
1927	109.8	107.8	+0.13	+0.55	+0.43	-0.42	-0.30
1928	113.2	107.0	+0.75	+0.73	+0.39	+0.02	+0.36
1929	117.0	120.2	+1.09	+0.95	+1.13	+0.14	-0.04
1930	103.5	102.1	+0.06	+0.20	+0.11	-0.14	-0.05
1931	87.2	84.0	-0.91	-0.72	-0.90	-0.19	-0.01
1932	67.1	66.2	-1.70	-1.84	-1.90	+0.14	+0.20
1933	--	74.8	-1.61	--	-1.42	--	-0.19
1934	--	78.3	-1.33	--	-1.22	--	-0.11

* For index of industrial production, year ending September 30.

† Based on relation to index of urban-consumer income.

‡ Based on relation to index of industrial production.

Sources of data:

Col. 1: Unpublished index compiled by the Bureau of Agricultural Economics of the United States Department of Agriculture. Compilation discontinued December, 1933.

Col. 2: Federal Reserve Board Index of Industrial Production (adjusted for seasonal variation), published monthly in the Federal Reserve Bulletin.

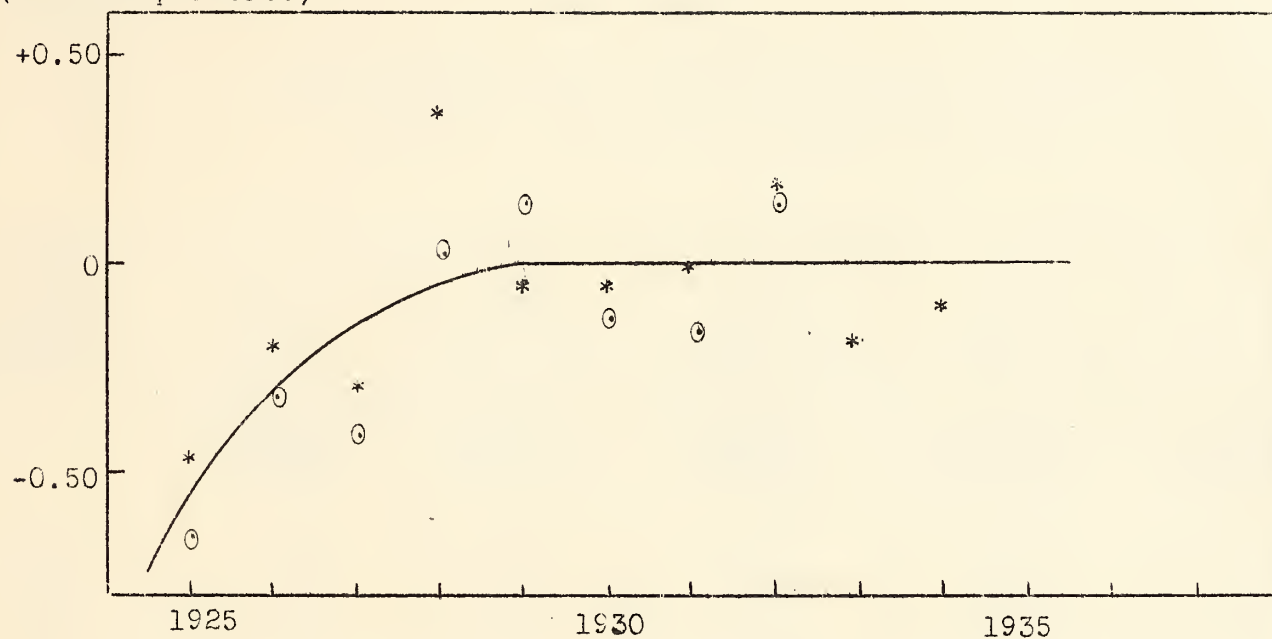
Col. 3: Table 2, col. 4.

Cols. 4 and 5: Readings from the curve in fig. 3.

Col. 6: Col. 3 minus col. 4.

Col. 7: Col. 3 minus col. 5.

Price residuals
(dollars per case)



Year beginning March 1.

Figure 4

Relation Between the Unexplained Price Variations
in Figure 2 and Trend of Demand, 1925-1934

(Data from table 4)

⊙ Based on relation to index of urban-consumer income.

* Based on relation to index of industrial production.

TABLE 4

Relation Between the Unexplained Price Variations
in Table 2 and Trend of Demand, 1925-1934

Year begin- ning March 1	Trend of demand factor	Price residuals* (fig. 3)	Price residuals† (fig. 3)	Price residuals* (fig. 4)	Price residuals† (fig. 4)
	1	2	3	4	5
	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>
1925	-0.56	-0.66	-0.48	-0.10	+0.08
1926	-0.30	-0.33	-0.20	-0.03	+0.10
1927	-0.15	-0.42	-0.30	-0.27	-0.15
1928	-0.05	+0.02	+0.36	+0.07	+0.41
1929	0	+0.14	-0.04	+0.14	-0.04
1930	0	-0.14	-0.05	-0.14	-0.05
1931	0	-0.19	-0.01	-0.19	-0.01
1932	0	+0.14	+0.20	+0.14	+0.20
1933	0	--	-0.19	--	-0.19
1934	0	--	-0.11	--	-0.11

* Based on relation to index of urban-consumer income.

† Based on relation to index of industrial production.

Sources of data:

Col. 1: Readings from curve in fig. 4.

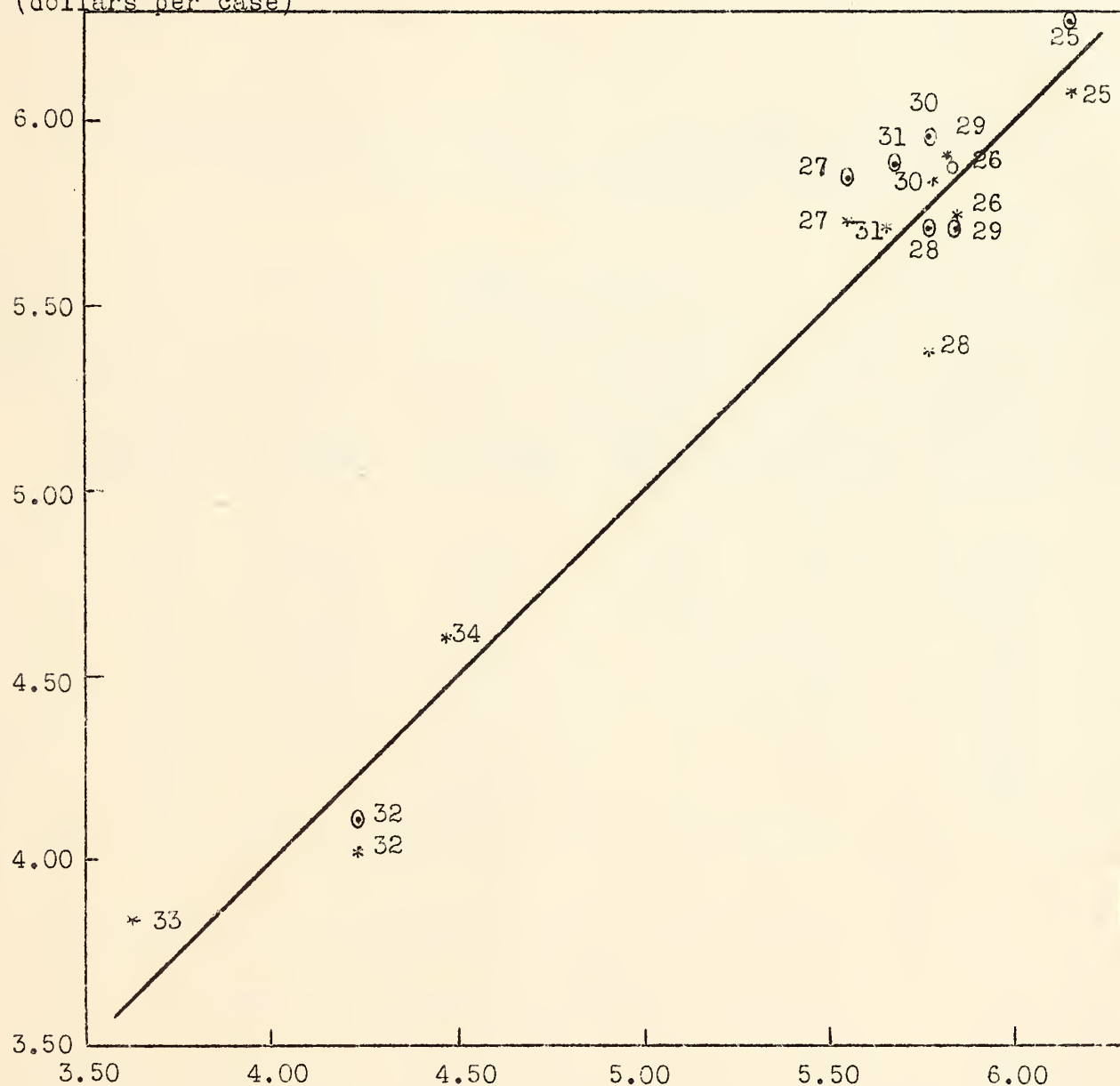
Cols. 2 and 3: Table 3, cols. 6 and 7.

Col. 4: Col. 2 minus col. 1.

Col. 5: Col. 3 minus col. 1.

Estimated f.o.b. prices
(dollars per case)

12.



Actual f.o.b. prices (dollars per case).

Figure 5. Comparison of Prices Estimated from Relationships Between Actual Prices and Important Factors Affecting Them with Actual F.O.B. Prices of Canned Asparagus, 1925-1934.

(Data from table 5)

TABLE 5

Comparison of Prices Estimated from Relationships Between Actual
Prices and Important Factors Affecting Them with Actual
F.O.B. Prices of Canned Asparagus, 1925-1934

Year begin- ning March 1	Price estimates (fig. 1)	Price residual estimates* (fig. 3)	Price residual estimates† (fig. 3)	Trend of demand factor	Estimated f.o.b. prices*	Estimated f.o.b.† prices	Actual f.o.b. prices
	1	2	3	4	5	6	7
	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>	<u>dollars</u> <u>per case</u>
1925	6.55	+0.27	+0.09	-0.56	6.26	6.08	6.16
1926	5.64	+0.53	+0.40	-0.30	5.87	5.74	5.84
1927	5.44	+0.55	+0.43	-0.15	5.84	5.72	5.57
1928	5.03	+0.73	+0.39	-0.05	5.71	5.37	5.78
1929	4.75	+0.95	+1.13	0	5.70	5.88	5.84
1930	5.73	+0.20	+0.11	0	5.93	5.84	5.79
1931	6.60	-0.72	-0.90	0	5.88	5.70	5.69
1932	5.94	-1.84	-1.90	0	4.10	4.04	4.24
1933	5.26	--	-1.42	0	--	3.84	3.65
1934	5.82	--	-1.22	0	--	4.60	4.49

* Based on relation to index of urban-consumer income.

† Based on relation to index of industrial production.

Sources of data:

Col. 1: Table 2, col. 3.

Cols. 2 and 3: Table 3, cols. 4 and 5.

Col. 4: Table 4, col. 1.

Col. 5: Col. 1 plus col. 2 plus col. 4.

Col. 6: Col. 1 plus col. 3 plus col. 4.

Col. 7: Table 1, col. 6.

F.o.b. prices
(dollars per case)

14.

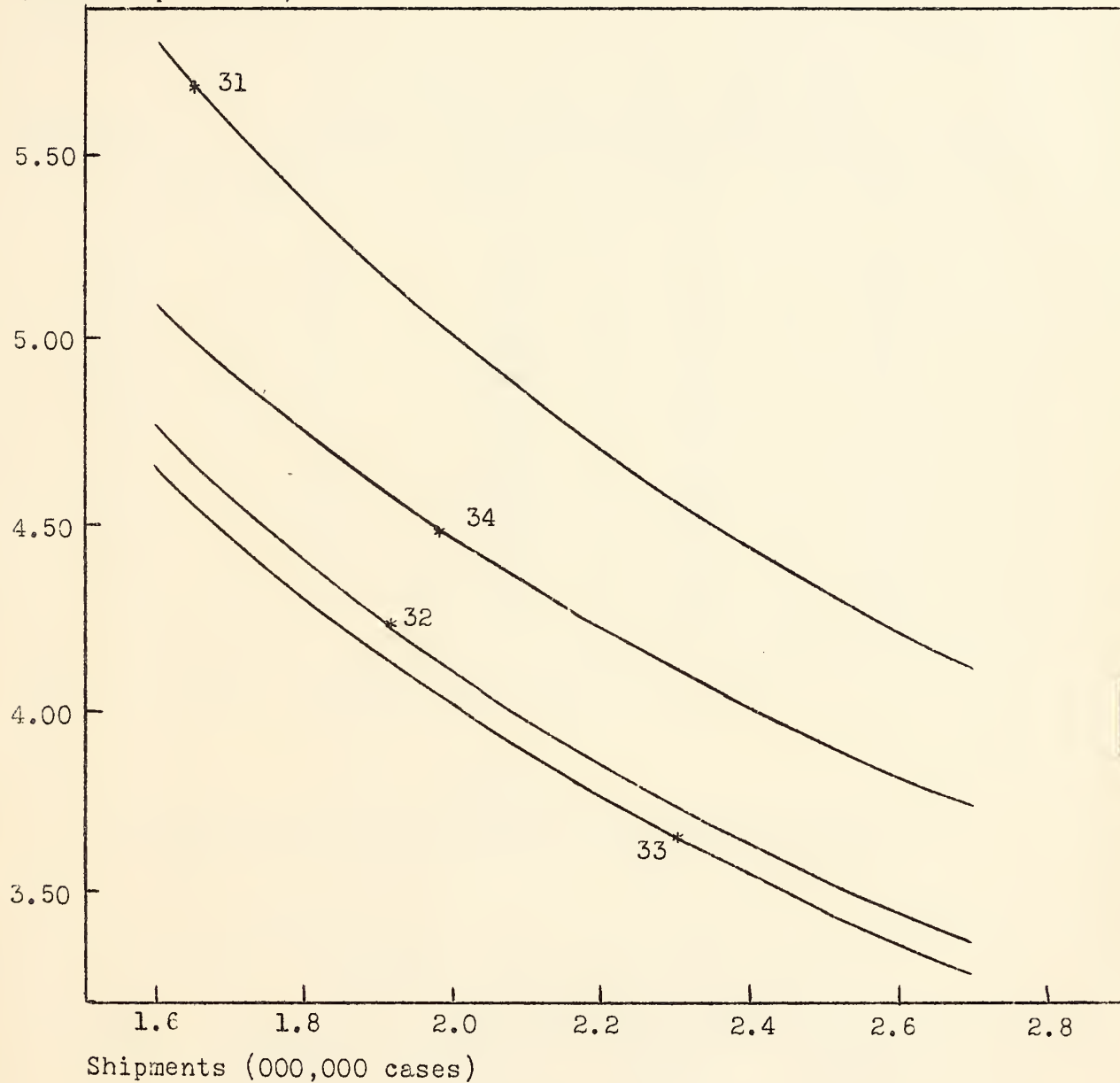


Figure 6

Prices Which Might be Expected for Various Quantities of Canned Asparagus with Demand Conditions Similar to those during the 1931-32, 1932-33, 1933-34, and 1934-35 Seasons.

(For readings from this chart, see tables 6 and 7.)

Prices Which Might be Expected for Various Quantities of
Canned Asparagus with Various Demand Conditions

Shipments (000 cases)	Prices (dollars per case) which might be expected with demand conditions similar to those present during the			
	1931-32 season	1932-33 season	1933-34 season	1934-35 season
1,600	5.81	4.76	4.65	5.10
1,700	5.58	4.57	4.47	4.92
1,800	5.37	4.40	4.30	4.75
1,900	5.18	4.24	4.15	4.60
2,000	5.00	4.10	4.01	4.46
2,100	4.85	3.97	3.88	4.33
2,200	4.70	3.85	3.76	4.22
2,300	4.56	3.73	3.65	4.10
2,400	4.43	3.63	3.55	4.00
2,500	4.31	3.53	3.45	3.90
2,600	4.20	3.44	3.36	3.81
2,700	4.10	3.36	3.28	3.73

Source of data: Readings from curves in fig. 6.

TABLE 7

Quantities of Canned Asparagus Which Might be Sold at
Various Prices with Various Demand Conditions

F.O.B. prices (dollars per case)	Quantities (000 cases) which might be sold with demand conditions similar to those present during the			
	1931-32 season	1932-33 season	1933-34 season	1934-35 season
4.00	--	2,075	2,010	2,400
4.10	2,700	2,000	1,935	2,300
4.20	2,600	1,925	1,865	2,210
4.30	2,510	1,860	1,800	2,125
4.40	2,425	1,800	1,735	2,045
4.50	2,345	1,740	1,680	1,970
4.60	2,270	1,685	1,625	1,900
4.70	2,200	1,630	--	1,830
4.80	2,130	--	--	1,765
4.90	2,065	--	--	1,710
5.00	2,000	--	--	1,650

Source of data: Readings from curves in fig. 6.

